

National Aquatic Animal Health Plan for the United States

Prepared by the
National Aquatic Animal Health Task Force
Joint Subcommittee on Aquaculture

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MISSION

The mission of the National Aquatic Animal Health Task Force on Aquaculture is to develop and implement a national aquatic animal health plan (NAAHP) for aquaculture in partnership and in cooperation with industry, regional organizations, State, local, and tribal governments, and other stakeholders, to:

- Facilitate the legal movement of all aquatic animals, their eggs, and products in interstate and international commerce;
- Protect the health and thereby improve the quality and productivity of farmed and wild aquatic animals;
- Ensure the availability of diagnostic, inspection, and certification services; and
- Minimize the impacts of diseases when they occur in farmed or wild aquatic animals.

ACKNOWLEDGMENTS

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CHAPTER 1. INTRODUCTION

1.1 Background and Rationale

1.1.1 The need for a national health plan

The National Aquaculture Act of 1980 (Public Law 96-362, 94 Stat. 1198, 16 U.S.C. 2801, et seq.) defines aquaculture as “the propagation and rearing of aquatic animals in controlled or selected environments,” including species of “finfish, mollusk, crustacean, or other aquatic invertebrate, amphibian, reptile, or aquatic plant.” Aquaculture is practiced throughout the United States and its Territories by private, public, and Native tribal entities. This critical economic and environmental activity provides a source of wholesome and healthy food, employment, recreation, supplementation of wild fishery stocks for harvest by commercial and tribal harvesters, and protection and restoration of aquatic animals that face extinction. Aquaculture also produces many other benefits, including medicines, education (public aquariums), and stress reduction (home aquariums).

Developing and implementing a national aquatic animal health plan has become urgent for two reasons: the growing need to protect our domestic commerce and resources, and the advent of new health regulations by foreign governments that restrict the import of live and processed aquatic animals from the United States.

The Joint Subcommittee on Aquaculture (JSA) commissioned a national task force to develop a national health plan for aquatic animals. The Federal agencies with primary responsibility for aquatic animal health — the U.S. Department of Agriculture (USDA), the U.S. Department of Commerce (DOC), and the U.S. Department of the Interior (DOI) — are leading the Task Force, which held its first meeting in 2001. The Task Force is chaired by the Animal and Plant Health Inspection Service (APHIS) of the USDA, with co-chairs from the DOI’s Fish and Wildlife Service (FWS) and the DOC’s National Oceanic and Atmospheric Administration (NOAA). Fisheries stakeholder meetings have been held to identify necessary components of the plan and a process for plan development.

This document incorporates feedback from our stakeholders and other Federal partners of JSA as to what a national plan for aquatic animals should provide. As this plan is developed, reviewed, pilot tested, and implemented, there is an expectation by the Task Force that the process will be dynamic, interactive, and transparent with the goal of achieving our mission and providing for the health and safety of our farmed and wild aquatic resources.

1.1.2 Aquaculture in food production

Traditional capture of wild aquatic animals will not meet the growing demand for seafood worldwide. Over 30 percent of the seafood consumed in the world is now of aquaculture origin, and it is projected that by the year 2030 over half of all seafood consumed will be from aquaculture (FAO. 2001. Aquaculture and inland fisheries fact sheet, FAO, Rome, 7pp). As more scientific evidence demonstrates the health benefits from eating seafood, the demand for seafood is likely to grow. Wild stocks are already overtaxed in many regions of the world and

fisheries are reduced or closed. Meeting the demand of consumers will only be accomplished by a significant increase in output from aquaculture.

The United States has a vision to meet the challenge of supplying increasing amounts of seafood to its citizens. This vision is expressed in the Aquaculture Act of 1980 and in the National Aquaculture Development Plan (most recent draft dated 2000) created by the JSA. The goals identified in the plan include protecting the health of our farmed and wild aquatic animals from the introduction of foreign animal diseases, reducing the proliferation and impact of diseases already existing in the United States, and developing and implementing programs of disease prevention. The plan states: “Without marked improvements in aquatic animal health management, U.S. aquaculture will not remain competitive in international markets.” Perhaps more dire than not competing successfully in the world markets would be the introduction of diseases into the United States that could deplete or eliminate important farmed and wild stocks.

1.1.3 Economic value of aquaculture in the United States

Aquaculture is a rapidly expanding economic activity in the United States. It is estimated that production of farmed aquatic animals more than doubled between 1985 and 1999, from approximately 400 million pounds to 987 million pounds, with a farm-gate value in 1999 of \$842 million (NMFS, 2001. Fisheries of the United States, DOC/NOAA/NMFS, August 2001). In 1992, aquaculture provided for 181,000 jobs nationwide and a total annual economic value of \$5.6 billion (Dicks et al., 1992). The total economic value of recreational fishery is estimated to be over \$30 billion annually, a large portion of which is a direct result of aquaculture production at public, tribal, and private hatcheries (DOI and DOC, Oct. 2002. National Survey of Fishing, Hunting and Wildlife Recreation).

Table 1 provides an estimate of the volume and farm gate value of selected species from 2002. New pilot offshore production programs have been started since that year, and data for ornamental propagation programs other than Florida are not available. Taking these factors into account, it is likely the data in Table 1 underestimates the total national production of farmed aquatic animals by 10 to 20 percent.

TABLE 1.—*Production and farm gate value of selected farmed aquatic animals in 2002. (Sources: Western Regional Aquaculture Center; California, Maine, Washington; DOC/NOAA.)*

Species farmed	Volume (pounds)	Farm gate value
Catfish	630,000,000	\$358,000,000
Tropical fish *	unknown	143,643,142
Mollusks**	101,694,000	86,270,000
Trout	54,451,000	70,000,000
Tilapia	18,000,000	24,300,000
Salmon	17,743,000	57,700,000
Baitfish***	11,600,000	39,000,000
Hybrid bass	10,490,000	31,000,000
Shrimp	4,217,000	12,188,000
TOTAL	848,195,000	822,101,142

* Florida only ** West coast only *** 1998 data only

Often overlooked in assessing the value of aquaculture is its contribution to wild fishery. In the western United States, hatchery production is critical in providing opportunity to commercial harvesters (Table 2). In Alaska, hatcheries operated by the State and private, nonprofit fishery cooperatives (PNPs) provide a significant amount of salmon. While in some areas harvest is primarily of wild origin, in other areas — particularly terminal fisheries operated by PNPs — virtually all the salmon harvested originated from their aquaculture operations. In States such as California, Oregon, and Washington, where many stocks of salmon are listed as threatened or endangered under the Endangered Species Act, harvest opportunities for commercial harvesters would not exist were it not for hatchery releases.

TABLE 2.—*Estimated economic value of cultured Pacific salmon harvested by commercial fishers in the United States in 2000. (Data sources: PSMFC Review 2002; Alaska Salmon Enhancement Report, ADFG, March, 2003.)*

State	Salmon harvested	Salmon of hatchery origin	Ex-vessel value	Income impact*
Alaska	137,163,000	29,794,000	\$59,699,000	(Not available)
Washington	1,534,000	825,000	4,278,000	\$301,000**
California***	479,000	335,000	7,212,000	15,892,000
Oregon***	148,000	104,000	2,145,000	4,600,000
Total	139,324,000	31,058,000	73,334,000	20,793,000

* Income impacts (\$), in 2002 dollars, are per pound per day estimates provided from output of the Fishery Economic Assessment Model for commercial ocean troll fisheries for cultured Chinook and Coho salmon only.

** Ocean troll fishery only

*** Harvested number of salmon in Oregon and California are ocean troll caught only, 98 percent of which are Chinook salmon in 2000.

The economic value for recreational salmon fishery in the Western United States for 2001 was over \$625 million (Table 3). During 2002–2003, survival to adulthood of some species of salmon, particularly Chinook salmon, reached historical highs. The result of these high survival rates has been an increase in harvest opportunities, which in turn translates to an even higher economic impact than those listed in Table 3. As with commercial salmon harvesting, recreational salmon fishing would not exist in most States were it not for hatchery production.

TABLE 3.—*Estimated economic value of recreational salmon fishery in U.S. Pacific region 2001. (Source: 2001 U.S. National Fishing and Hunting Survey, DOI/DOC; PSMFC annual reports)*

State	Total Angler Fishing Days*	Salmon of Hatchery Origin	Ex-vessel value	Income impact**
California	27,730,000	4,568,000	\$334,335,000	\$234,034,000
Washington	12,741,000	5,065,000	339,400,000	179,882,000
Oregon	8,848,000	2,756,000	187,444,000	131,210,000
Alaska	3,641,000	2,509,000	370,774,000	80,538,000
Total	52,960,000	14,898,000	1,231,953,000	625,664,000

* Anglers 16 years and older

** Economic value of recreational salmon fishery is based on proportion of wild to enhanced catch in commercial fishery.

The total value of recreational fishing in the United States is estimated to exceed \$30 billion annually. Of that expenditure, over \$21 billion is for freshwater fishing (2001 National Survey of FWS. 2002). It is difficult to determine the portion that is a result of aquaculture production, but it is substantial. Nationwide, an estimated 83 million trout angler days occur annually, a significant portion of which is a result of cultured fish; as an example, trout hatchery activity in the southeastern United States adds nearly \$265 million to the economy (Table 4).

TABLE 4—*Annual economic effects as a result of trout production at national fish hatcheries in Southeast United States. (Source: FWS. 1999. Trout Fishing in the United States.)*

Hatchery Name	Annual Trout Angler Days	Total Economic Effects	Federal and State Tax Revenue	Annual Hatchery Budgets
Norfolk, AR	1,306,000	\$91,162,000	\$4,069,000	\$694,000
Dale Hollow, TN	698,000	57,269,000	2,722,000	526,000
Greer Ferry, AR	648,000	45,723,000	2,025,000	346,000
Wolf Creek, KY	445,000	40,029,000	2,236,000	285,000
Chattahoochee, GA	360,000	30,416,000	1,532,000	262,000
Total	3,457,000	264,599,000	12,584,000	2,113,000

1.1.4 Intangible benefits of a healthy aquatic ecosystem

While the economic value of aquaculture based on production of aquatic animals for food and harvest by commercial and recreational fishers has been demonstrated, other benefits provided by aquaculture are difficult or impossible to measure. For example, a dollar value cannot be placed on the restoration and rehabilitation of an aquatic animal that is on the brink of extinction, the recreational value of fishing, or the enjoyment from home aquariums. All of these activities are a result of aquaculture or impacted in some way by the general aquatic animal health in the United States.

1.1.5 Impact of infectious diseases on aquaculture

Disease poses the greatest threat to the success of aquaculture. Infectious diseases can cause significant losses to aquatic animals, both farmed and wild, and the consequences can range from decreased productivity in an aquatic farm to complete depopulation of infected stocks (Amos et al. 2001. Risk analysis in aquatic animal health. Proceedings of an OIE conference. Paris, France.). In recent years, outbreaks of infectious salmon anemia (ISA) and spring viremia of carp (SVC) in private U.S. aquaculture operations have resulted in losses of over \$10 million. Global losses in shrimp aquaculture due to white spot shrimp virus disease (WSSV) are estimated to be as high as \$3 billion annually (Subasinghe et al. 2001. Technical Proceedings of the Conference on Aquaculture in the Third Millennium. 20-25 February, 2000. Bangkok, Thailand).

Disease outbreaks can result in significant economic loss even if few animals die during the disease event. Live and processed seafood exports total an estimated \$11 billion annually

(DOC/NOAA/NFS. 2001. Fisheries Statistics for the United States.). If certain disease agents are discovered in the United States, international commerce in some aquatic animals could be restricted or eliminated. The United States currently has an annual deficit of approximately \$7 billion in international seafood trade, and our goal is to reduce that deficit. This can only be accomplished by protecting the health of aquatic animals.

1.1.6 Impact of infectious disease on native aquatic wildlife

Disease events caused by infectious agents are not restricted to cultured aquatic animals. There are documented cases of severe mortality in wild populations caused by both endemic and exotic diseases. For example, naturally-occurring infectious haematopoietic necrosis (IHN) virus causes loss in wild Pacific salmon. In Norway, the parasite *Gyrodactylus salaris* was introduced via the importation of infected smolts from the Baltic Sea to a government hatchery. Wild populations of Atlantic salmon on west coast of Norway were severely impacted as a result. With the Norwegian scenario in mind, basic health and survival of aquatic species are closely tied to larger global issues such as import, export, risk assessment, and disease surveillance.

1.2 Long-Term Goals

There are four long-term goals for the development and implementation of a national aquatic animal health plan:

- Support aquaculture as a viable business activity in the United States;
- Protect our nation's farmed and wild aquatic resources from the unwanted introduction or spread of devastating infectious diseases;
- Provide for effective interstate and international trade; and
- Meet the United States' national and international legal obligations.

1.2.1 Support aquaculture as a viable business activity

To be competitive with foreign producers and to maintain production costs that will allow an aquaculture endeavor to be profitable, farmers must continue to improve efficiency of production and health of their animals. The implementation of the NAAHP will provide a variety of benefits to producers, including:

- Comprehensive disease prevention, diagnosis, and treatment programs;
- Research to prevent and/or treat disease outbreaks;
- Training to provide a cadre of health professionals to service private operations; and
- An outreach and awareness program to inform the public about the safety of seafood and the protection of natural resources.

1.2.2 Protect cultured and wild resources

Federal agencies have stewardship responsibilities for cultured and wild species alike. One of the primary objectives of the NAAHP is to identify the elements of a health management plan that will provide for the protection of wild and cultured resources while enabling effective and efficient aquaculture.

1.2.3 Provide for effective interstate and international trade

The intra- and international movement of live aquatic animals is essential if aquaculture is to successfully occur in the United States. However, the movement of any animals raises the concern that infectious diseases will be introduced or spread. The NAAHP will create the framework for ensuring the safe movement of aquatic animals, thus supporting safe, efficient and predictable commerce.

1.2.4 Meet the United States' national and international legal obligations

Companies that export live aquatic animals must meet the requirements of the country to which they are shipping. The United States currently does not have an infrastructure established that meets all the requirements of our trading partners. Likewise, programs necessary to limit or prevent inappropriate imports of high-risk animals into the United States are not in place. Further, rules of interstate commerce in the United States do not meet our obligations under the World Trade Organization (WTO). The NAAHP will bring the United States closer to international norms and recommendations of the World Organization for Animal Health (OIE), rules of other countries including those in the European Union (EU), and the rules and policies under the North American Free Trade Agreement and WTO.

1.3 Guiding Principles

The Task Force set forth four principles by which the elements of the NAAHP have been developed. The following sources contributed to these principles:

- OIE Code (2002)

- A business case in support of a national aquatic animal health program. (DFO, Canada. 2002)

- Salmonid disease control policy of the fisheries co-managers of Washington State. (WDFW, 1998)

- Manual of procedures for the implementation of the Asia regional technical guidelines on health management for the responsible movement of live aquatic animals. (FAO/NACA, 2001)

1.3.1 Science-based standards

The elements of the NAAHP are constructed using established scientific principles of fish health management. To the degree possible, the latest scientific research and publications were incorporated into this document. Stakeholder groups composed of scientific experts, such as the American Veterinary Medical Association, the American Fisheries Society, and government management agencies, have provided reviews and comments under the highest level of scientific scrutiny and professionalism.

One science-based method involves evaluating the disease risks associated with the movement of product. This analysis must be conducted in a transparent fashion so that the exporting country/zone clearly understands the concerns of the importing country/zone, and the difference between scientific facts and subjective opinion is clearly delineated.

Risk analysis is preferable to a zero-risk approach because it encourages a more objective decision-making process and provides opportunity for relevant regulatory entities to discuss proposed transfers. It continues to be the right of any managing entity to accept or reject the import of live aquatic animals into its management area (Appropriate level of protection - SPS Agreement of WTO). However, when an entity rejects an import, it must be prepared to justify that decision. This standard applies not only to international trade but also to inter- and intrastate commerce.

1.3.2 Transparent and collaborative process

The development of the NAAHP must be an open and visible process in which stakeholders have the opportunity for input. Further, participants in the process must represent a broad range of interests from the aquaculturists (private, Federal, State, and tribal) who own and operate aquaculture facilities to the government and tribal entities that regulate aquaculture. By holding stakeholder workshops and broadly distributing reports during the development of the plan, the NAAHP was developed in a transparent and collaborative manner.

1.3.3 Essential, logical, and feasible guidelines

Limited resources are available to manage the health of our nation's aquatic animal resources. It is the intent of the Task Force to create a program that will allow safe and productive aquaculture yet will include only the essential elements for success. In addition to being affordable, the plan must make sense to stakeholders and be capable of implementation. If the NAAHP does not make logical sense or is too onerous or complicated, it will not achieve its goal of enabling safe, effective, and efficient aquaculture in the United States.

1.3.4 Consistency with international standards

Trade with international partners is at risk because of the absence of guidelines and rules for the management of fish diseases and pathogens. Foreign countries with disease control programs in place, such as members of the EU, have little interest in receiving live aquatic animals that may present a risk to their aquatic animals. The aquatic animal health standards of the United States must be brought into line with the rest of the world. The standards proposed in this document are consistent with WTO and OIE standards and, to the extent possible, consistent with Federal, State, and tribal regulations already in existence in the United States.

1.4 Process for Developing the NAAHP

The process for developing the NAAHP is described in the document titled: "Development of a National Aquatic Animal Health Plan" as approved by the FEC of the *Task Force* (Appendix A).